

Introduction

Technologies are booming which use light as a manufacturing tool or as a means of information transfer. These technologies employ wavelengths ranging from low ultraviolet through visible up to the far infrared. The new challenges which they present for ceramics go far beyond the development of new light-transmitting grades; they include components as diverse as new reflecting (opaque) substrates or new ceramic tools for the manufacture of special optical components.

However, even when there is focus on the specific field of “Transparent Ceramics”, such as there was at the Symposium held in Berlin, Germany, during the days of 17–21 June 2007, it is not simple to find a common language which can bring together the representatives of such different areas of development as thin opto-electronic films, smaller optical parts, transparent windows, or laser ceramics with a thickness of several centimeters.

Such applications are not only distinguished by an entirely different interplay of optical, thermal and mechanical properties, they also have their own way of dealing with the primary focus on “real” transparency or translucency. Another difficulty in bringing the different communities together comes from the rival attractions of the many specialised congresses which are organized every year focusing, for example, on opto-electronic devices, on advanced lithography materials, on laser ceramics, or on ceramic armour.

With this background and especially with the wide industrial importance of the new light-transmitting ceramics, it is not really surprising that the “Transparent Ceramics” Symposium at 10th ECerS Conference should be as much characterised by the enthusiasm of the contributing authors as by the volume of the interested audience!

Recognising the significance of this meeting which has succeeded in drawing together representatives of the different areas where transparent ceramics play a crucial role, the attempt has been made in the present issue of the journal to present

selected contributions on recent advances in transparent ceramics research and in applications. The themes include:

- overviews on the physics of light transmission and on transmitting ceramics and their manufacture;
- functional transparent ceramics;
- ceramic armour;
- ceramics for laser and optical applications;
- transparent glass ceramics.

In terms of agreed outcomes from the meeting, one conclusion is to recognise the outstanding importance of the granulometric characteristics and the purity of raw materials. Here, today’s situation still frequently presents a misfit between our physical understanding of the materials and the requirements of defect-free ceramic processing on the one hand and the commercial opportunities on the other hand. It is therefore a pleasure to report that the contributions included in this volume have resulted from stimulating and constructive discussions brought about by the participation of researchers from both industry and from academic institutes.

Comparing the different fields, it is obvious that the physical background, the technological means and the final objectives of such diverse components as thin opto-electronic films and thick lenses for lithography do not have everything in common. Nonetheless, most participants have agreed that the different viewpoints of the neighbouring communities concentrated on the single subject of “light transmission through a ceramic material” have given rise to refreshing advances in understanding.

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